

"tubercle" can only lead to confusion, especially now that, in connection with bovine and other tuberculosis, it is so frequently heard at agricultural gatherings. Several peculiarities in spelling, adhered to throughout the work, might in a new edition be brought into conformity with general usage: examples are afforded in *Tellectia*, *Cecydomyia*, *Centorhynchus*, *Sitona*, *Chonopodium*, *Claviceps purpurea*.

It is difficult to understand why the second of the volumes of which the titles head this notice has been prepared, unless it be to find favour with candidates in a certain specified examination, the syllabus of which, however, the author tells us, "has not been slavishly followed." The really valuable parts of the book have apparently been culled from the writings of five living agricultural authors whose names are mentioned in the preface, and who, if they turn over the pages of this compilation, can hardly fail to alight upon much that they have seen before. It is regrettable that the author did not cling to his guides throughout. He would not in that case have said of sainfoin: "In appearance the leaves resemble those of vetches, but the blossom is more like that of red clover." Apart from the worthlessness of such a statement as this, it cannot fail to raise a doubt as to whether the author has ever seen a field of sainfoin. Again, with reference to lucerne, we read: "Like sainfoin, it produces good crops for about ten years." Where, we would ask, is the district in which sainfoin stands for anything like this period? What is meant by the statement that "sainfoin is much harder than lucerne"? The germination of a seed is described as "the period parallel to the sucking of a young mammal"; and elsewhere we read, "nitrication goes on or acts more quickly under circumstances favourable for rapid growth, and in this respect is parallel to germination." Nothing, perhaps, indicates the character of the book more thoroughly than the page of illustrations entitled "Various Specimens of — s Grass Seeds." We omit the name of the seedsman, who probably would be sorry to claim that a seed of rye-grass, for example, sold by him is different from all other rye-grass seed.

The 350 pages of the book are divided into no fewer than 70 chapters. *Inter alia* a treatise on chemistry is introduced, with figures of a spirit-lamp and test-tube. From a chapter on "Blossoms and their functions," we cull the following specimen of literary grace: "We are apt to look upon them merely as objects created to feast man's eye with their beauty, or his nose with their sweet scent." The language of the book is of an irritating style, which is constantly in evidence from the grammatical blunder at the close of the preface down to the final chapter, in which reference is made to what "the plant needs to live healthy." It is, however, only fair to add that, at the outset, the author writes: "It has been my endeavour to avoid errors."

The sub-title of Mr. L. H. Bailey's book—"A compendium of useful information for fruit-growers, truck-gardeners, florists, and others"—indicates its scope. In a score of chapters such subjects are dealt with as injurious insects, insecticides, plant diseases, fungicides, lawns, grafting, seeding, storing of fruits and vegetables,

the weather, and many other matters of practical interest. It is stated in the preface: "The contents of the volume have been gleaned from many sources; and, whilst the compiler cannot assume the responsibility of the value of the many recipes and recommendations, he has exercised every care to select only those which he considers to be reliable." The result is a most valuable book, and though intended primarily for American readers, it will none the less constitute a useful reference manual for horticulturists in this country. We notice, with regard to potato disease, that it is recommended to spray the plants with Bordeaux mixture "upon the first indication of the blight." It would probably be better to follow the advice, recently published by the Irish Land Commission, to spray before the appearance of disease, and thus employ the application as a preventive rather than a remedial measure. It is when the reader meets with such a remark as the "marsh-marigold or so-called cowslip," that he must bear in mind the American origin of the book. There is probably no better work of its kind.

OUR BOOK SHELF.

Electrical Laboratory Notes and Forms. Arranged and prepared by Dr. J. A. Fleming, F.R.S. (London: The Electrician Printing and Publishing Co.)

It is now generally recognised that the best way to teach the rudiments of science is by the natural or kindergarten method, which aims at leading the young student to observe facts and phenomena for himself, and come to conclusions concerning them. The method is applied easily enough to very elementary practical work, and with the best results. In the case of elementary work in physics, all the student requires to be told is what to do, and he may be left to find the teaching of his results. For instance, it is only necessary to instruct him to find the weights of equal bulks of different liquids and solids, and the results of his experiments show him at once what relative density means. This principle of letting the results of experiments suggest conclusions is undoubtedly the right one for introductory courses of practical physics and chemistry; indeed, almost the only information that need be given to the students in the laboratory is how to set up their simple apparatus and what to do with it; nothing ought to be said about what they are going to prove, or the experiments lose their value of developing the faculties of acute observation and intelligent induction from the observed facts.

Advanced work in physics and chemistry offers difficulties to the extension of the scientific method of observation and induction. The time spent in the laboratories is far too short to enable students to re-discover the more intricate laws and relationships for themselves, however admirable the mental training of such researches may be; and if the instruments are all arranged so that it is only necessary to press a knob to make them act, and obtain a result, the value of the mechanical observations then made cannot be very great. The difficulty of applying the scientific method to physical laboratory work is brought out by the volume before us. The volume contains twenty elementary and twenty advanced exercises in electrical measurement. Each exercise consists of a six-page sheet, two pages of which are occupied with a condensed account of the theoretical and practical instructions for performing the particular experiment, while the remaining pages are ruled up in lettered columns, to be filled in by the student with the results of his observations. What the student does

is really to test the accuracy of formulæ, mostly arrived at by theoretical considerations; the work is therefore purely deductive, and not inductive. Yet it is difficult to see how to make the work covered by these notes anything but deductive; certainly no better system of teaching practically the elements of electrical engineering has so far been developed.

By means of Dr. Fleming's notes and a little oral assistance now and then, the student will be able to perform instructive experiments, and will be taught to observe closely, and to record his results neatly. The method followed facilitates the work of the demonstrator and the student, and enables a large amount of practical work to be carried out in a comparatively short time.

Microbes and Disease Demons. By Dr. Berdoe. Pp. 93. (Swan Sonnenschein and Co., 1895.)

UNDER the above sensational title the writer discusses, or rather attacks, the anti-toxin treatment of diphtheria. It is difficult to understand what has prompted the production of so prejudiced and, we regret to say, unscientific comment upon this subject. We most emphatically take exception to such expressions as "scientific quackery," and others of a similar character, being applied to investigations of which, although the therapeutic value may be as yet a question of opinion, undoubtedly mark a new step forward in our endeavour to unravel the problems surrounding disease.

We have no intention of discussing Dr. Berdoe's views in detail, but we feel ourselves called upon to refer to one statement, because the writer has used it as a vantage ground for his most savage attack upon this method of treating diphtheria. We refer to the death in Brooklyn alleged to have resulted from the injection of some of the anti-toxin. Several pages are devoted to a detailed account of the incidents of the case, and Dr. Berdoe does not hesitate to designate it as "sudden death from anti-toxin." This, however, is not the view of the Brooklyn Health Department, or of authorities in the Bacteriological Laboratory of the New York City Board of Health, in both of which institutions the anti-toxin used was submitted to a very careful and exhaustive examination, and the official opinion given that it was not responsible for the death of the patient.

The case for or against the anti-toxin treatment of diphtheria is not one which should be approached from a party point of view, and such prejudiced, vaporous effusions as Dr. Berdoe has permitted himself to indulge in, will never take any part in deciding the question of its efficiency. To arrive at any such positive conclusion is of necessity a matter upon which time and experience can alone give the final verdict, and its discussion should only be entrusted to those who are capable of approaching the subject in a scientific and judicial spirit.

Men-gu-yu-mu-tsi; or, Memoirs of the Mongol Encampments. Translated from the Chinese by P. S. Popov, Russian General Consul at Peking. 580 pp. (*Memoirs of the Russian Geographical Society*, vol. xxiv.; Russian.) (St. Petersburg, 1895.)

THIS is the work of two Chinese men of science, Chjan-mu, or Shi-chjou, author of a history of Jinghiz khan's conquests, and Khe-tyu-tao, author of several geographical works, of which the description of the northern borderlands is best known. It was published in China in 1867, and consists of two parts: a description of the different tribes and confederations into which the Mongols are divided, with short notes on the extent of the territories they occupy, and short historical notices—the whole covering only about 160 pages of the Russian edition—and a great number of most interesting foot-notes, which cover more than two-thirds of the volume, and contain a great variety of miscellaneous geographical and historical information.

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LETTERS TO THE EDITOR.

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University of London Election.

I HAVE read the letters which Mr. Bennett, Mr. Thiselton-Dyer, and Prof. Ray Lankester have addressed you on the subject of the University of London, and much regret that my friends, whose opinion I value so much, take exception to one paragraph in my letter to Prof. Foster. I do not wish to seem to treat their views with any want of respect, and perhaps, therefore, you will allow me to send a few lines in reply.

They all criticise the sentence in which I state that I should endeavour to maintain the right of Convocation given in the Charter, which expressly provides that no alteration should be made in the constitution of the University without the assent of Convocation.

Prof. Ray Lankester says that "Sir John Lubbock has adopted and made himself the leader of this extraordinary and fantastic policy." Whether it is extraordinary and fantastic or not, is of course a matter of opinion, but, at any rate, it is the law at present.

I am satisfied that my constituents highly value this right, and I fail to understand how Mr. Thiselton-Dyer has been able to persuade himself that in endeavouring to maintain it I am taking a line "not courteous to Convocation," or have given "Convocation the severest slap in the face it has ever received."

Prof. Ray Lankester also says that I "have shown an unfavourable estimate of the intelligence" of my constituents. This is such an extraordinary version (not to say perversion) of what I said, that I trust you will allow me to quote my own words. What I said was—

"Feeling that Convocation ought to be consulted on a matter so vitally affecting the University, I should strongly urge, and would do my best to secure, that the scheme when arranged should be submitted to Convocation for their approval, to be signified as at a senatorial election, and would oppose the Bill unless this were conceded."

Why should this proposal appear to my friends as being, in Mr. Bennett's words, fatal to "all hopes of bringing our University into line with the requirements of the age"? The Commissioners will either propound a wise scheme or an unwise one. My critics believe that it will be wise. Why, then, should they assume that Convocation will reject it? At any rate it is an extraordinary reason for attacking me as a Member of Parliament, that I have faith in the good sense and sound judgment of my constituents.

JOHN LUBBOCK.

High Elms, July 30.

Metrical Relations of Plane Spaces of n Manifolds.

PLANE spaces of n manifoldness are assumed to have the following properties:—

(1) Given a S_{n-1} (a plane space of $n-1$ manifoldness) and a point P outside the same, then a certain S_n will exist which contains both the S_{n-1} and P .

It follows therefore that a S_n is determined by $n+1$ of its points, unless these points have that special situation to each other by virtue of which they are contained in a plane space of minor manifoldness.

(2) If a plane space S_n contains $n+1$ points, which have not the special situation to each other above mentioned, then it will contain the plane space S_n , determined by these points.

It therefore appears that $n+1$ points determine a S_n uniquely.

Given a straight line L and any point P upon the same: through L any number of planes can be constructed, each of which contains a certain line L' through P perpendicular to L . The aggregate of such lines L' , in a space S_n form a S_{n-1} , which has that special position towards L by virtue of which it is called perpendicular to L in P .

To prove this theorem, which certainly holds if $n=2$ or 3 , let us assume that it is true when $n=k$; then it will also be true when $n=k+1$. Through P , in a space S_k which contains L and is contained by S_n , construct the S_{k-1} perpendicular to L . Any point not contained in the S_{k-1} and L determines a plane,